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10/605,938	11/06/2003	Jonathan M. D. Hill	SYCH1100-1	2937

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EXAMINER	
MCADAMS, BRAD	

ART UNIT	PAPER NUMBER
2456	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/605,938	HILL ET AL.	
	Examiner	Art Unit	
	ROBERT B. MCADAMS	2456	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 September 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,13-15,17,21,22,26,30,33,40,41,46,47,50,54,56 and 59* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,13-15,17,21,22,26,30,33,40,41,46,47,50,54,56 and 59* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to the amendment filed on September 01, 2009.

2. Claims 1, 2, 13-15, 17, 21, 22, 26, 30, 33, 40, 41, 46, 47, 50, 54, 56 and 59 are pending.

Response to Arguments

3. Applicant's arguments with respect to Claims 1, 2, 13-15, 17, 21, 22, 26, 30, 33, 40, 41, 46, 47, 50, 54, 56 and 59 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 1-2, 13-14, 17, 21, 30, 33, 40-41, 46-47, 54 and 56** are rejected under 35 U.S.C. 103(a) as being unpatentable over *Liu* (U.S. Patent No. 5,031,089) in view of *Johansson* (U.S. PGPub No. 2005/0044206 A1) and in further view of *Agarwal* (U.S. Patent No. 5,958,010).

As to **Claims 1 and 54,** *Liu* teaches regulating resource usage **(Column 6, Lines 55-57)** by a plurality of distributed applications **(Tasks; Figure 1)** running on a plurality of interconnected machines **(Computer No. 1-n; Figure 1)** comprising:

providing a system comprising a plurality of machines connected to each other through a network, wherein the plurality of machines run one or more operating systems **(Figure 1)**;

detecting applications running on the machine **(Column 9, Lines 13-36)**;

However *Liu* does not expressly disclose detecting the operating system processes and network traffic associated with the application.

Agarwal, in the same field of endeavor, teaches detecting the operating system processes and network traffic associated with the application **(Agent 50 monitors traffic that passes between application processes. Paragraph bridging Columns 7 and 8).**

At the time of invention, it would have been obvious to a person of ordinary skill in the art to have combined the method of resource regulation as taught by *Liu* with regulating traffic passed between processes as taught by *Agarwal*. The motivation would have been to regulate network traffic to further regulate the complete network system.

Liu-Agarwal does not expressly disclose receiving and distributing among the machines an initial resource allocation policy based on the detected applications and operating system processes and network traffic associated with the applications;

Johansson, in the same field of endeavor, teaches receiving and distributing among the machines an initial resource allocation policy based on the detected applications **(Step 51, Figure 5a; Paragraph 0029).**

At the time of invention, it would have been obvious to a person of ordinary skill in the art to have combined the method regulating resource usage of detected applications and associated network traffic as taught by *Liu-Agarwal* with first establishing an initial resource policy having an initial resource allocation policy as taught by *Johansson*. The motivation would have been to initially set policies for each resource on the interconnected machines.

Liu-Agarwal-Johansson further teach gathering, by a plurality of interconnected machines, information on the state and health of applications and system resources at each of the machines **(*Liu;* Task Allocation and Transfer Logic 28 accesses the calculated Workload Indicator 30 on all of the interconnected machines, the Workload Indicator 30 indicating the state and usage of system resources and the workload of the tasks on each machine. Column 9, Lines 23-34 and 43-47)**; each machine receives a subset of the total information gathered and a portion of the initial resource policy wherein the subset of the total information received by each machine corresponds to one or more applications running on that machine **(*Liu;* Each machine requests and receives the Workload Indicator 30, indicating the workload of each task on the machine, "total information gathered", and the initial resource policy**

as described by *Johansson (Paragraph 0029)*, for each task running on each machine. Column 9, Lines 40-47);

each machine detecting one or more requests for resources by one or more of the plurality of distributed applications; at each of the plurality of interconnected machines, allocating the resources to each of the plurality of distributed applications based on the subset of the total information gathered **(*Liu;* Task Allocation and Transfer Logic 28 in each machine allocates tasks, on each machine, based on the Queue size of the task up to its maximum threshold. Paragraph bridging Columns 8 and 9 and Column 9, Lines 13-36)**;

determining the resource consumption by the plurality of each application based on its actual usage **(*Liu;* Service Rate 26 is the ratio of computational usage of each task in the queue compared with its maximum potential. Column 9, Lines 20-31)**;

periodically exchanging resource information amongst the plurality of interconnected machines **(*Liu;* Task Allocation and Transfer Logic 28 on each machine requests and receives Workload Indicator 30 from all other nodes. Column 9, Lines 40-43)**, wherein the resource information includes requests for the resources **(Queue Length),** resource consumption **(Percentage of active contents),** resource availability at each of the plurality of interconnected machines **(Workload Indicator 30)** the current demand levels and the application priorities **(*Liu;* Column 10, Lines 1-9)**; and at each of the plurality of interconnected machines, adjusting the resources to each application of the plurality of distributed applications based upon the

periodically exchanged resource information received by that machine **(*Liu;* When Workload Indicator 30 is determined to be above a pre-determined threshold level on a particular machine, the resources are adjusted by transferring the job to another machine with a smaller Workload Indicator 30. Figure 5; Column 9, Lines 37-63)**.

As to **Claims 2 and 56,** *Liu-Agarwal-Johansson* further teaches wherein said resources include one or more of communication resources, network bandwidth shared by the plurality of machines, computing resources, processing resources available at the plurality of machines, memory resources available at the plurality of machines **(*Liu;* System resources. Column 7, Lines 13-21)**.

As to **Claims 13 and 33,** *Liu-Agarwal-Johansson* further teaches wherein each machine comprises a kernel space and a user space module, wherein each of the user-space modules **(Figure 3)** comprises:

a data store for writing persistent data to the local disc of the host computer, wherein data is redundantly replicated on the local disc of a configurable number of peer hosts **(*Liu;* Workload Indicator 30, Figure 4; Column 9, Lines 40-43)**;

a shepherd for organizing and maintaining a configuration of machines in the kernel space which can be made available to other resources **(*Liu;* Operating System 24 provides Service Rates 26 of the local machine which is made available to other machines to calculate the workload. Column 9, Lines 23-31)**;

a policy manager for tracking the policies specified for applications and the available resources, for monitoring the resource utilization, and for storing the monitoring information in the data store **(*Liu;* Logic 28 monitors the resource utilization and compares said usage to policy information and stores utilization information in the Workload Indicator data store. Column 9, Lines 26-36)**;

an event scheduler for receiving events from the kernel space and supplying the information to other components in the user-space module **(*Liu;* The SIDA receives Service rate events from the kernel and passes said events to other modules such as Task Allocation and Transfer Logic 28. Column 9, Lines 23-31)**;

and a process scheduler for receiving information from the policy manager about resource entitled to each program, monitoring all processes running on a machine and communicating to the policy manager the resource utilization of each program, wherein the priorities for allocation of resources are adjusted based on occurrence of particular events, wherein the policy manager receives information about the occurrence of the events and monitors the resource utilization of all applications, jobs, processes and flows and records the information in a data store **(*Liu;* Figure 5; Column 9, Lines 13-63)**.

As to **Claim 14,** *Liu-Agarwal-Johansson* further teaches wherein said detecting step includes detecting each instance of a program running at each of the plurality of machines **(*Liu;* Column 9, Lines 18-23).**

As to **Claim 17,** *Liu-Agarwal-Johansson* further teaches wherein the plurality of interconnected machines comprises a flow scheduler, wherein each machine includes a portion of the flow scheduler, wherein said exchanging step is performed by the flow scheduler **(*Liu;* Transfer Logic 28, Figure 4; Column 9, Lines 40-50).**

As to **Claims 21 and 46,** *Agarwal-Liu-Johansson* teach a bandwidth-conversing protocol **(*Agarwal;* UDP and other bandwidth conservative protocols are used. Column 9, Lines 26-31)**.

As to **Claims 30 and 47,** *Liu* teaches a system for regulating utilization of computer resources of a plurality of interconnected computers, the system comprising:

a plurality of computers having local resources to be regulated which are interconnected to each other through a network, wherein each computer comprises a kernel space module; a user-space module comprising **(Figure 4; Column 6, Lines 55-57)**:

a monitoring module provided at each computer having resources to be regulated, for monitoring resource utilization and providing the resource utilization information to other interconnected computers having resources to be regulated **(Task Allocation 28; Column 9, Lines 13-31)**;

However *Liu* does not expressly disclose providing a global distributed policy.

Johansson, in the same field of endeavor, teaches a manager module for providing a global, distributed policy governing the global utilization of resources

available on the plurality of computers **(Centralized controller provides an initial global utilization policy, Figure 5a; Paragraph 0029)**;

At the time of invention, it would have been obvious a person of ordinary skill in the art to have combined the method regulating resource usage as taught by *Liu* with first establishing an initial resource policy having a set of resource utilization goals as taught by *Johansson*. The motivation would have been to initially set policies for each resource on the interconnected machines.

Liu-Johansson further teach an enforcement module at each computer for which resources are to be regulated for regulating usage of resources based on said global, distributed policy and resource utilization information received from other interconnected computers, wherein each computer of the plurality of computers periodically exchanges information with other computers of the plurality of computers, including updates to the global, distributed policy **(*Liu;* Figure 5; Column 9, Lines 37-63)**.

detecting applications running on the machine **(*Liu;* Column 9, Lines 13-36)**;

However *Liu* does not expressly disclose detecting the operating system processes and network traffic associated with the application.

Agarwal, in the same field of endeavor, teaches detecting the operating system processes and network traffic associated with the application **(Agent 50 monitors traffic that passes between application processes. Paragraph bridging Columns 7 and 8).**

At the time of invention, it would have been obvious to a person of ordinary skill in the art to have combined the method of resource regulation as taught by *Liu* with

regulating traffic passed between processes as taught by *Agarwal*. The motivation would have been to regulate network traffic to further regulate the complete network system.

Liu-Agarwal does not expressly disclose receiving and distributing among the machines an initial resource allocation policy based on the detected applications and operating system processes and network traffic associated with the applications;

Johansson, in the same field of endeavor, teaches receiving and distributing among the machines an initial resource allocation policy based on the detected applications **(Step 51, Figure 5a; Paragraph 0029).**

At the time of invention, it would have been obvious to a person of ordinary skill in the art to have combined the method regulating resource usage of detected applications and associated network traffic as taught by *Liu-Agarwal* with first establishing an initial resource policy having an initial resource allocation policy as taught by *Johansson*. The motivation would have been to initially set policies for each resource on the interconnected machines.

Liu-Agarwal-Johansson further teach gathering, by a plurality of interconnected machines, information on the state and health of applications and system resources at each of the machines **(*Liu;* Task Allocation and Transfer Logic 28 accesses the calculated Workload Indicator 30 on all of the interconnected machines, the Workload Indicator 30 indicating the state and usage of system resources and the workload of the tasks on each machine. Column 9, Lines 23-34 and 43-47)**; each

machine receives a subset of the total information gathered and a portion of the initial resource policy wherein the subset of the total information received by each machine corresponds to one or more applications running on that machine **(*Liu;* Each machine requests and receives the Workload Indicator 30, indicating the workload of each task on the machine, "total information gathered", and the initial resource policy as described by *Johansson (Paragraph 0029)*, for each task running on each machine. Column 9, Lines 40-47)**;

each machine detecting one or more requests for resources by one or more of the plurality of distributed applications; at each of the plurality of interconnected machines, allocating the resources to each of the plurality of distributed applications based on the subset of the total information gathered **(*Liu;* Task Allocation and Transfer Logic 28 in each machine allocates tasks, on each machine, based on the Queue size of the task up to its maximum threshold. Paragraph bridging Columns 8 and 9 and Column 9, Lines 13-36)**;

determining the resource consumption by the plurality of each application based on its actual usage **(*Liu;* Service Rate 26 is the ratio of computational usage of each task in the queue compared with its maximum potential. Column 9, Lines 20-31)**;

periodically exchanging resource information amongst the plurality of interconnected machines **(*Liu;* Task Allocation and Transfer Logic 28 on each machine requests and receives Workload Indicator 30 from all other nodes. Column 9, Lines 40-43)**, wherein the resource information includes requests for the

resources **(Queue Length),** resource consumption **(Percentage of active contents),** resource availability at each of the plurality of interconnected machines **(Workload Indicator 30)** the current demand levels and the application priorities **(*Liu;* Column 10, Lines 1-9)**; and at each of the plurality of interconnected machines, adjusting the resources to each application of the plurality of distributed applications based upon the periodically exchanged resource information received by that machine **(*Liu;* When Workload Indicator 30 is determined to be above a pre-determined threshold level on a particular machine, the resources are adjusted by transferring the job to another machine with a smaller Workload Indicator 30. Figure 5; Column 9, Lines 37-63)**.

As to **Claims 40 and 41,** *Liu-Agarwal-Johansson* further teaches wherein said monitoring module at a given computer provides resource utilization information to each other connected computer in response to particular events, wherein said resource utilization information provided by said monitoring module includes one or more of information regarding requests for communication resources and information regarding requests for processing resources **(*Liu;* Figure 5; Column 9, Lines 37-50).**

6. **Claims 15 and 26** are rejected under 35 U.S.C. 103(a) as being unpatentable over *Liu* (U.S. Patent No. 5,031,089) in view of *Johansson* (U.S. PGPub No. 2005/0044206 A1) and in further view of *Agarwal* (U.S. Patent No. 5,958,010) and in further view of *Ullmann* (US Patent No. 7,120,685 B2).

As to **Claim 15,** *Liu-Johansson-Agarwal* teach the method of regulating resource usage as previously discussed in Claim 1.

However, *Liu-Johansson-Agarwal* do not expressly disclose application detection rules established by a user.

Ullmann, in the same field of endeavor, teaches wherein said detecting step is performed by application detection rules established by a user **(Column 5, Lines 10-29).**

At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify the detecting step of *Liu-Johansson-Agarwal* with the user established rules as taught by *Ullmann*. The motivation would have been to allow the user customization options to better analyze data.

As to **Claim 26,** *Ullmann-Liu-Johansson-Agarwal* teach displaying collected information to display to a user **(*Ullmann;* Column 3, Lines 33-46).**

7. **Claims 22 and 59** are rejected under 35 U.S.C. 103(a) as being unpatentable over *Liu* (U.S. Patent No. 5,031,089) in view of *Johansson* (U.S. PGPub No. 2005/0044206 A1) and in further view of *Agarwal* (U.S. Patent No. 5,958,010) and in further view of *Keshav* (US Patent No. 6,985,937 B1).

As to **Claims 22 and 59,** *Liu-Johansson-Agarwal* teach the scheduling step as previously discussed in Claim 1.

However, *Liu-Johansson-Agarwal* does not expressly disclose moderating communications.

Keshav, in the same field of endeavor, discloses including one or more of the steps of immediately transmitting all communications if the bandwidth information indicates communication traffic is light, delaying a portion of the communication is the bandwidth information indicates communication traffic is heavy, delaying transmission of communications by lower-priority information and load balancing, wherein said load balancing includes redirecting communications received at a first computer to a second computer **(Column 9, Lines 23-42 and Column 11, Lines 22-31).**

At the time of invention, it would have been obvious to a person of ordinary skill in the art to have combined the scheduling step as taught by *Liu-Johansson-Agarwal* with moderations of communications as taught by *Keshav*. The motivation would have been to balance the traffic between the machines.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT B. MCADAMS whose telephone number is (571)270-3309. The examiner can normally be reached on Monday-Thursday 6:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bunjob Jaroenchonwanit can be reached on 571-272-3913. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. B. M./
Examiner, Art Unit 2456

/Bunjob Jaroenchonwanit/

Supervisory Patent Examiner, Art Unit 2456